

**MEMORANDUM OF UNDERSTANDING
SITE INVESTIGATION SCOPE
NPD Laboratory Site, Troutdale, Oregon**

Dry Well

Collect soil samples at four (4) locations around periphery of soil removal between the ground surface and one (1) foot beneath the ground surface (BLS) and at depth in native material beneath the soil removal using direct push technology. One field duplicate sample will be collected. Collect nine (9) soil samples total and analyze for the EPA Contract Laboratory Program (CLP)-list volatile organic compounds (VOCs), semivolatile organic compounds (SVOCs), trace metals, including uranium and strontium, and cyanide, using SW 846 methods 8260 (VOCs), 8270 (SVOCs), 6000/7000 (trace metals), and 9014 (cyanide).

Transformer Pad

Collect soil samples at four (4) locations around the periphery of the transformer pad between ground surface and one (1) foot BLS and analyze these samples for polychlorinated biphenyl (PCB) hydrocarbons only using SW Method 8082.

Drainage Ditch

Collect soil samples in the drainage ditch at the locations listed below:

- ? South property boundary near the vault. This sample will be considered one background sample.
- ? Freeze-thaw tank drain.
- ? Hazardous waste storage shed drain.
- ? Immediately north of the oil house and drum storage
- ? Former ditch removal area
- ? At the culvert immediately south of Graham Road
- ? North of Graham Road immediately east of the landfill
- ? North of Graham Road at the western end of the ditch. This sample will be considered the second background sample.

Collect two (2) samples between ground surface and 1 foot and at 5-feet BLS at the locations listed below:

- ? The freeze-thaw tank drain
- ? The hazardous waste storage shed drain
- ? Immediately north of the oil house and drum storage shed
- ? At the culvert immediately south of Graham Road.

One soil sample will be collected in the native material at depth in the former ditch removal area, and between ground surface and 12 inches BLS in the two locations north of Graham Road. All samples will be analyzed for EPA CLP-list VOCs, SVOCs, and trace elements, plus uranium and strontium, and cyanide, using SW 846 methods 8260, 8270, 6000/7000, and 9014. Thirteen soil samples and one field duplicate will be collected.

Concrete Sump

Collect one (1) sediment sample inside the sump and analyze for EPA CLP-list VOCs, SVOCs, and trace elements, plus uranium and strontium, and cyanide, using SW 846 methods 8260, 8270, and 6000/7000, and 9014.

Landfill

Trench in four (4) locations and collect one soil sample representative of fill material and one sample in native material, if encountered, using direct push technology. One field duplicate samples will be collected. Collect samples between ground surface and 12 inches BLS at four (4) locations along the north toe of the landfill. Remove the exposed drums and collect one sample representative of the drum contents. All samples will be analyzed for EPA CLP-list VOCs, SVOCs, and trace elements, plus uranium and strontium, and cyanide, using SW 846 methods 8260, 8270, 6000/7000, and 9014. A maximum of thirteen (13) samples will be collected (i.e., twelve (12) soil samples and one field duplicate).

The partially exposed drums around the toe of the landfill will be removed, as will any drums encountered during the trenching activities.

Fuel Oil Tank Vault

Collect one (1) sample in native material beneath the excavation beneath the toe wall using direct push technology and analyze for EPA CLP-list VOCs, SVOCs, and diesel-range total petroleum hydrocarbons (TPH) using SW 846 methods 8260, 8270, and 8015.

Laboratory

Collect three (3) groundwater samples from microwells or piezometers installed using direct push technology along the western side of the laboratory building and analyze for EPA CLP-list VOCs, SVOCs, total and dissolved trace elements, plus uranium and strontium, and cyanide, using SW 846 methods 8260, 8270, 6000/7000, and 9014.

Groundwater

Conduct water level surveys at six (6) groundwater monitoring wells (MW-1, -2, -3, -4, -5, and -6). Collect one representative groundwater sample at each location and analyze for EPA CLP-list VOCs, SVOCs, total and dissolved trace elements, plus uranium and strontium, and cyanide, using SW 846 methods 8260, 8270, 6000/7000, and 9014. Well stability parameters will be monitored during development and purging. Purging will be conducted using low-flow techniques.

Analytical Scope of Work

The analytical scope of work anticipated for the site investigation is presented in Table 1. Target compounds and elements are presented in Table 2.

Table 1. Sample and Analysis Scope of Work						
Parameter	Analytical Method	Numbers of Samples	Field QC Samples			Total Number of Samples
			Field Duplicates ¹	Trip Blanks ²	Equipment Rinsates ³	

Table 1. Sample and Analysis Scope of Work						
			Field QC Samples			
Soil Samples						
VOCs	SW 8260	35	4	4 maximum	2 Maximum	46
SVOCs	SW 8270	35	4	?	2 maximum	42
PCBs	SW 8082	4	?	?	?	4
Trace Elements, including strontium and uranium	SW 6000/7000	34	4	?	2 maximum	42
Cyanide	SW 9014	34	4	?	2 maximum	41
TPH	SW 8015	1	?	?	?	1
Drum Contents						
VOCs	SW 8260	1	?	1	?	2
SVOCs	SW 8270	1	?	?	?	1
Trace Metals, including strontium and uranium	SW 6000/7000	1	?	?	?	1
Cyanide	SW 9014	1	?	?	?	1
Groundwater						
VOCs	SW 8260	9	1	2 maximum	1	13
SVOCs	SW8270	9			1	11
Cyanide	SW 9014	9	1	?	1	11
Total and dissolved trace Elements, including strontium and uranium	SW 6010/7000	9	1	?	1	11

¹ One field duplicate will be collected for every 10 samples collected.

² One trip blank will be collected each day samples to be analyzed for VOCs are collected.

³ One equipment rinsate will be collected for every 20 samples collected.

Table 2. Site Investigation Target Compound and Element List		
VOCs	SVOCs	Metals
Dichlorofluoromethane	Benzaldehyde	Aluminum
Chloromethane	Phenol	Antimony
Bromomethane	Bis(chloroethyl) ether	Arsenic

Table 2. Site Investigation Target Compound and Element List		
VOCs	SVOCs	Metals
Vinyl chloride	2-chlorophenol	Barium
Chloroethane	2-methylphenol	Beryllium
Trichlorofluoromethane	2,2'-oxybis(1-chloropropane)	Cadmium
1,1,2-Trichloro-1,2,2-trifluoroethane	Acetaphenone	Calcium
Methylene chloride	4-methylphenol	Calcium
Acetone	n-nitroso-di-n-propylamine	Chromium
Carbon disulfide	Hexachloroethane	Cobalt
Methyl acetate	Nitrobenzene	Copper
1,1-dichlorethene	Isophorone	Iron
1,1-dichloroethane	2-nitrophenol	Lead
cis-1,2-Dichloroethene	2,4-dimethylphenol	Magnesium
trans-1,2-Dichloroethene	Bis(2-chloroethoxy)methane	Manganese
Methyl tert butyl ether	2,4-dichlorophenol	Mercury
Chloroform	Naphthalene	Nickel
1,2-dichloroethane	4-chloroaniline	Potassium
2-butanone	Hexachlorobutadiene	Selenium
Bromochloromethane	Caprolactam	Silver
1,1,1-trichloroethane	4-chloro-3-methylphenol	Sodium
Cyclohexane	2-methylnaphthalene	Strontium
Carbon tetrachloride	Hexachlorocyclopentadiene	Thallium
Bromodichloromethane	2,4,6-trichlorophenol	Uranium
1,2-dichloropropane	2,4,5-trichlorophenol	Vanadium
Cis-1,3-dichloropropene	1,1'-biphenyl	Zinc
trichloroethene	2-chloronaphthalene	
Methyl cyclohexane	2-nitroaniline	
Dibromochloromethane	Dimethylphthalate	
1,1,2-trichloroethane	Acenaphthylene	
Benzene	2,6-dinitrotoluene	
Trans-1,3-dichloropropene	3-nitroaniline	
Bromoform	Acenaphthene	
Isopropylbenzene	2,4-dinitrophenol	
4-methyl-2-pentanone	4-nitrophenol	
2-hexanone	Dibenzofuran	
Tetrachloroethane	2,4-dinitrotoluene	
1,2-dibromoethane	Diethylphthalate	
Toluene	4-chlorophenyl-phenyl-ether	
1,1,2,2-tetrachloroethane	Fluorene	
Chlorobenzene	4-nitroaniline	
Ethylbenzene	4,6-dinitro-2-methylphenol	
Styrene	n-nitrosodiphenylamine	
Xylenes (total)	4-bromophenyl-phenyl ether	
1,2-dichlorobenzene	Hexachlorobenzene	
1,3-dichlorobenzene	Atrazine	
1,4-dichlorobenzene	Pentachlorophenol	
1,2,4-trichlorobenzene	Phenanthrene	
	Anthracene	

Table 2. Site Investigation Target Compound and Element List		
VOCs	SVOCs	Metals
	Carbazole	
	di-n-butylphthalate	
	Fluoranthene	
	Pyrene	
	Butylbenzylphthalate	
	3,3'-dichlorobenzidine	
	Benzo(a)anthracene	
	Chrysene	
	Bis-(2-ethylhexyl)phthalate	
	di-n-octylphthalate	
	Benzo(b)fluoranthene	
	Benzo(k)fluoranthene	
	Benzo(a)pyrene	
	Indeno(1,2,3-c,d)pyrene	
	Benzo(g,h,i)perylene	

Schedule

The proposed schedule is presented in Table 3.

Table 3. Proposed Site Investigation Schedule	
Activity	Date
Provide Memorandum of Understanding to EPA and ODEQ	March 21, 2001
Concurrence from EPA and ODEQ	April 4, 2001
Issue SOW to Contractor	April 11, 2001
Receive Cost Proposal from Contractor	April 18, 2001
Award Contract	May 4, 2001
Draft PMP to USACE	June 8, 2001
USACE – Agency Comments Due	July 6, 2001
Responses to Comments due to USACE	July 20, 2001
Final PMP due to USACE	August 3, 2001
Field Work Begins	August 17, 2001
Field Work Ends	August 31, 2001
Draft Site Investigation Report	October 31, 2001
USACE – Agency Comments Due	November 28, 2001
Responses to Comments Due to USACE/Agencies	December 19, 2001
Final Site Investigation Report Due	January 2, 2002